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THE ECONOMIC RETURNS TO SCHOOLING IN THE WEST BANK AND GAZA STRIP

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The Economic Returns to Schooling in the West Bank and Gaza Strip

By

Joshua D. Angrist*

Revised: February 1995

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Abstract

This paper offers a first look at micro data from the Labor Force Surveys conducted in the West Bank and the Gaza Strip between 1981 and 1991. The data provide evidence of major changes in the wage distribution of workers from the West Bank and Gaza in the 1980s. One of the most important changes is that between 1981-87 wage differences between schooling groups fell by well over one-half. This sharp reduction in wage differentials by schooling group is associated with large increases in the size of the educated labor force. At the same time, the returns to schooling for Israeli Jews were stable. The decline in returns to schooling for Palestinians is also apparent in panel data. These results are consistent with the notion that the returns to schooling in the territories were determined largely by the forces of supply and demand in a segmented market for skilled labor.

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The West Bank of the Jordan river and the Gaza Strip on the southeastern edge of the Mediterranean Sea were captured by Israel from Jordan and Egypt in June 1967. The economies of both the West Bank and Gaza Strip grew rapidly after 1967, in large part as a consequence of significant labor market and product market integration with Israel (Metzer, 1992). Until 1972, there were no institutions of higher education in these territories. Beginning in 1972, new local institutions of higher education began to open in the West Bank. Previously, Palestinian residents of the territories had had to obtain their advanced schooling abroad. But by 1986, there were 20 institutions granting post high school degrees in the territories (Simon 1988). As a consequence, in the early and mid 1980s, the labor market was flooded with new college graduates. This paper studies the impact of this dramatic influx of skilled workers on the distribution of wages in the occupied territories.

The influx of Palestinian graduates provides a remarkable natural experiment with which to study the impact of a dramatic increase in skilled labor on the returns to schooling in a developing country context. Moreover, the sudden increase in the number of Palestinian graduates can be used to investigate whether the measured returns to schooling are a statistical artifact attributable to individual heterogeneity that is correlated with school enrollment.

The existence of a relatively sophisticated and ongoing labor force survey in the territories makes this research possible. First, the Territories Labor Force Survey (TLFS) uses a simple questionnaire corresponding roughly to Current Population Survey (CPS) definitions of labor market status, with a rotation-group design that can be used to construct short panels. The latter feature of the TLFS is important because panel data for developing countries is relatively rare and often of low quality (Ashenfelter, Deaton, and Solon 1985). Second, because product markets in Israel and the territories are integrated, changes in Israeli schooling differentials can be used to check whether changes in Palestinian returns to schooling are related to demand

shocks common to the two economies.

Changes in wage differentials and employment opportunities in the territories are of especial interest because of recent political developments. If the declining price of skilled labor was really caused by a shift in skilled labor supply, then it is natural to ask what prevented new investments in physical capital arising to complement newly cheap and abundant human capital. Palestinians have long complained that employment opportunities for graduates and investment opportunities for entrepreneurs have been deliberately limited by the Israeli bureaucracy (JMCC 1992). At the same time, Israeli security forces have acknowledged that poor employment prospects for graduates are likely to have contributed to the atmosphere of frustration and discontent culminating in the 1987 Palestinian Uprising (Simon 1988.) Evidence of a decline in the relative wages of well-educated workers provides evidence for the veracity of the Palestinian claims.

The next section of the paper describes TLFS data. Section II describes the distribution of schooling groups in the Palestinian labor force. Section III outlines a theoretical framework and describes wage differentials by schooling group. Section IV discusses evidence on schooling differentials from panel data and Section V interprets the main findings as movements along a stable demand curve for skilled workers. Section VI presents some comparisons to schooling coefficients for Israeli citizens. The last section concludes.

I. LABOR MARKET DATA AND LABOR FORCE CHARACTERISTICS[1]

In 1967, the Israeli Central Bureau of Statistics (CBS) conducted a population Census in the West Bank and Gaza Strip. Since August 1968, the 1967 Census has been used as a sampling

[1]Background material in this section is drawn from the CBS serial for 1989-90 (CBS, 1991a).

frame (which is periodically updated) for quarterly labor force surveys in the territories. Because of the TLFS rotation group design, each surveyed household is interviewed four times. Households chosen for the survey are randomly divided into 4 rotation groups, each of which is interviewed for 2 consecutive quarters, excluded for two consecutive quarters, and interviewed again for 2 consecutive quarters. Interviews for the TLFS are conducted by local Palestinian enumerators employed by the Israeli Civil Administration in the territories.

The sample used here contains observations on men aged 18–64 interviewed in the years 1981–91. Men constitute the bulk of the Palestinian labor force because labor force participation rates for women are very low, ranging between 6–9 percent in the sample period (CBS, 1991a). Basic descriptive statistics and sample sizes for the extract used here are reported in Table 1. Roughly 30 to 37 thousand interviews were conducted each year in about 7,500 households interviewed 4 times each. The fraction of the sample residing in the Gaza strip fluctuates from a high of 27 percent in 1981–86 to a low of 20 percent in 1988. The mean age of men in the sample is 33.

Approximately half of the men in the sample are wage laborers, the remainder being mostly self-employed (including work on a family farm or business), unemployed, or in school. Wage laborers constitute 2/3 of the labor force, with participation rates ranging from 72 to 82 percent. The fraction of men in the labor force who were employed in Israel and Jerusalem is shown in the last column of Table 1. This fraction ranges between 37 and 39 percent, including the 8–9 percent of the labor force employed in Jerusalem. Other figures not shown in the table, indicate that the average schooling level in the sample rose from 7.7 years in 1981 to 8.65 years in

1991.[2] The fraction of the labor force with 13 or more years of schooling rose from 7 to 12 percent between 1981 and 1990. The fraction with less than 12 years of schooling fell from 81 percent to 67 percent. Additional figures not reported in the table show that among men in the labor force with 13 or more years of schooling, the fraction employed as wage and salary workers fell about 10 percentage points during 1981-84 but was stable at around 70 percent from 1984 until the 1991 Gulf war.

The usual types of sampling and non-sampling errors in labor force surveys are also present in the TLFS. In addition, data collection after 1988 became more difficult because of civil disturbances in the territories. Because TLFS data on the territories were collected by an agency of the occupying power (the Israeli civil administration), TLFS data may be less accurate than data from comparable labor force surveys carried out elsewhere.[3] Moreover, although there are many sensible patterns in the TLFS data on labor force status (e.g., seasonality; see Angrist, 1994), data on wages are often poor even in the best circumstances. The data appendix therefore presents a brief comparison of CBS wage data to wage data from Palestinian and administrative sources.

II. SCHOOLING GROUPS IN THE LABOR FORCE

The educated Palestinian labor force grew substantially throughout the sample period. This is documented in Figure 1, which plots the log of weighted counts of labor force participants by schooling group, *minus* the log of the count in first quarter 1981. Thus, small differences along

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[2]The schooling question in the TLFS records the "number of years of schooling (including the present year for those still enrolled) in all schools ever attended."

[3]According to CBS (1991a), during the period of unrest the fact that some men respond to questions about days worked by reporting the number of paid work days as opposed to the number of days actually on the job is potentially misleading.

the y-axis are approximately equal to percentage changes. For example, the figure shows that between 1982 and 1984 the number in the labor force with 13–15 years of schooling grew by roughly 40 percent (.5–.1) while the number in the labor force with 11 or fewer years of schooling grew by only a few percentage points.

The first university founded in the territories was Bir Zeit in 1972, located north of Jerusalem in the West Bank. Subsequent growth in university enrollment was rapid.[4] Enrollment in West Bank and Gaza Strip universities doubled between 1981–1985 (from 6,450 to 13,083 students), and 6,600 university students graduated between 1981 and 1986 (Simon, 1988). Substantial increases in the number of graduates are also recorded in data from post-secondary vocational and technical schools in the territories (Al-Qiq, 1988).

Many of the newly educated labor force entrants did not find jobs. Figure 2 plots unemployment rates by schooling group.[5] In 1981, the unemployment rate for the less educated was around 1 percent, while more educated workers were unemployed at a rate of 2–5 percent. But in 1985 the unemployment rate of male labor force participants with 16 or more years of schooling reached almost 16 percent, and the unemployment rate for men with 13–15 years of schooling group reached 13 percent. In contrast, unemployment rates for men with 12 years of schooling did not exceed 5 percent until late 1989. All groups experienced high unemployment rates during the Gulf War. The next section shows that the large differences in employment rates by schooling group are paralleled by changes in wage differentials.

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[4]Universities in the territories are institutions that offer four-year programs leading to a Bachelor's Degree. Before offering a four-year program, Bir Zeit was a two-year junior college.

[5]Workers are defined as employed if they worked one or more hours in the last full week before the interview, or were absent from work; they are unemployed if they did not work and actively sought work. The labor force is the sum of employed and unemployed.

III. THE DISTRIBUTION OF WAGES

A. Theoretical Framework

My interpretation of the empirical results in this paper is motivated by a simple equilibrium model of workers in two skill groups who can work in one of two locations.[6] Suppose the labor force consists of N workers, including N_u unskilled workers and N_s skilled workers, and let $\pi = N_s/(N_s+N_u)$. Workers supply daily labor either locally or as migrants in Israel. Demand for migrants is assumed to be perfectly elastic at a migrant daily wage, w_m, which is the same for both skill groups. We can therefore write the probability a skilled worker works locally as $p_{\ell s}(w_m, w_{\ell s})$ and the probability an unskilled worker works locally as $p_{\ell u}(w_m, w_{\ell u})$, where $w_{\ell s}$ and $w_{\ell u}$ are local daily wage rates for skilled and unskilled workers.

I also assume the demand for workers in each skill group depends only on the skill-group's wage rate and aggregate earnings (though product demand). Local demand functions for skilled and unskilled workers can therefore be written $d_{\ell s}(w_{\ell s},y_\ell)$ and $d_{\ell u}(w_{\ell u},y_\ell)$, where $y_\ell \equiv w_{\ell s}N_s p_{\ell s}+w_{\ell u}N_u p_{\ell u}+w_m(N-N_s p_{\ell s}-N_u p_{\ell u})$ is total earnings (assuming everyone works somewhere). Local equilibrium wages and employment are determined by a system of two equations, in which w_m is a parameter:

$$d_{\ell s}(w_{\ell s},y_\ell) = \pi[Np_{\ell s}(w_m, w_{\ell s})]$$

$$d_{\ell u}(w_{\ell u},y_\ell) = (1-\pi)[Np_{\ell u}(w_m, w_{\ell u})]$$

This simple framework allows us to predict the impact of a change in π on skill differentials. Suppose that income effects on local demand are negligible (as suggested by results in Angrist, 1994). Then we have:

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[6]Similar models are discussed by Johnson (1980) and Altonji and Card (1991).

(1) $$d\ln w_{ts}/d\pi = \pi/(\eta_{ss} - \epsilon_{ss}) < 0,$$

$$d\ln w_{tu}/d\pi = -(1-\pi)/(\eta_{uu} - \epsilon_{uu}) > 0,$$

where η_{ss} and η_{uu} are local labor demand elasticities with respect to local wage rates and ϵ_{ss} and ϵ_{uu} are local supply elasticities with respect to local wage rates. These relationships imply that increasing the fraction skilled in the labor force will decrease skill differentials.

If income effects are non-negligible, this conclusion must be modified to take account of the fact that changing wage rates will shift labor demand. But income effects are unlikely to be large enough to dominate the own-wage demand and supply effects. Note also that migrant wages affect skill differentials solely through income effects in local labor demand and a labor supply response, both of which are likely to be similar across skill groups. Allowing for a migrant wage response to changes in quantities is therefore unlikely to change the basic conclusion regarding skill differentials in this model.

The assumed absence of an Israeli demand for Palestinian skills accentuates the impact of increases in π on skill differentials because such demand would make the local supply of skills more elastic. In practice, the empirical results show that Israelis do pay a premium for some Palestinian schooling groups, but it is much less than the local premium. Finally, note that wage compression in this model is aggravated by the assumed absence of complementarity between skilled and unskilled labor and, more importantly, between labor and other factors of production. The impact of changes in π is necessarily larger when the demand for skilled labor does not shift out in response to decreases in the cost of human capital. These characteristics of the model, if true, increase the likelihood of sharply declining schooling differentials in the face of increases in the supply of educated workers.

B. Wage Differentials by Schooling group

The quarterly time series of real (September 1992 NIS) average daily and monthly wages are graphed in Figure 3. Average real wages declined between 1983 and 1985, and again at the end of the sample period. In contrast, the period 1985-88 was one of exceptionally strong growth in real daily wages.

The analysis of schooling differentials begins with Figure 4, which plots average log daily wages by schooling group after removing period effects for each quarter and age effects for each year.[7] The figure shows substantial schooling premia for two groups only: men with 13–15 years of schooling and men with 16 or more years of schooling. An important feature of this figure is the decline in schooling differentials since 1985. Between 1981 and 1985, men with 13–15 years of schooling received an average 10-15 percent daily wage premium, while those with 16 or more years of schooling received an average 25 percent daily wage premium. By 1987, however, the wage premium for men with 13–15 years of schooling was eliminated, and the premium for men with 16 or more years of schooling was less than half the earlier level.

Table 2 combines features of the figures in a regression model. Coefficients reported in the table are parameter estimates from the following equation:

$$(2) \quad \log(w_{it}) = \Sigma_q \, d_{iq}\delta_{qt} + \Sigma_{c,t} \, (a_{ic} \cdot y_{it})\beta_{ct} + \Sigma_{g,t} \, (b_{ig} \cdot y_{it})\gamma_{gt} + f_{it}\theta_t + \upsilon_{it},$$

where d_{iq} is a dummy variable that indicates whether observation i is observed in quarter q, and δ_{qt} is a quarter-q effect in year t; a_{ic} is a dummy variable that indicates age group c, y_{it}

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[7]Figure 4 plots residuals from the following regression:

$$\log(w_{it}) = \Sigma_t \, d_{it}\delta_t + \Sigma_{c,t} \, (a_{itc} \cdot y_{it})\beta_{ct} + \upsilon_{it} \, ,$$

where d_{it} is a dummy variable that indicates if observation i is in quarter t, δ_t is a quarter effect, a_{itc} is a dummy variable that indicates if observation i is in age group c, y_{it} is a dummy variable that indicates if observation i is in year t, and β_{ct} is an age effect in year t. The regression and the averages were computed using CBS sampling weights.

is a dummy variable that indicates year t, and β_{ct} is an age effect in year t; b_{ig} is a dummy variable that indicates schooling group g and γ_{ct} is a schooling effect in year t; f_{it} is a dummy variable that indicates work in Israel or Jerusalem and θ_t is a work location effect in year t. Age groups indexed by c are: age 25–34, age 35–44, age 45–54, age 55–64. Schooling groups indexed by g are: 13–15 years, and 16 or more years. This dummy variable parameterization captures the most important wage differences by schooling group.[8]

Additional covariates in the regression include sets of annual effects for residence in the Gaza Strip, residence in a refugee camp, and residence in an urban area. The dependent variables are the log of daily wages and the log of monthly wages. The sample excludes observations with reported real wages above 15,000 shekels/month (about 6,000 dollars).

Workers from the territories employed in Israel are concentrated in semi-skilled and unskilled jobs, and in the Israeli construction and agriculture industries (See Table 1 and Kleiman 1992, Semyonov and Lewin-Epstein 1987). The first column of Table 2 shows that the daily wage premium for working in Israel fell from roughly 18 percent in 1981 to zero in 1984.[9] The Israel wage premium then rises steeply beginning in 1986. Daily wages in Israel were 37 percent higher than local wages by 1989, nearly doubling the 1987 wage differential. The monthly wage premium for working in Israel moves similarly. These changes parallel the pattern of Palestinian absences from work, and are consistent with movements along an inelastic

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[8]The high school premium (relative to those with less than 12 years of schooling) averaged around 5 percent for the years 1981-1985. It too declined sharply between 1984 and 1988.

[9]This decline is probably because of the 1983-84 recession and an inflation stabilization program in 1985, which involved wage guidelines and price controls that led to a substantial erosion of real wages. Wages and prices in the territories were less effectively controlled (Artstein and Sussman, 1990; Zakai, 1988).

Israeli demand curve for Palestinian labor (Angrist, 1994).

Columns 2 and 3 show that schooling differentials in daily wages declined steadily until 1989 and became negative for men with 13–15 years of schooling in 1988–89. Although schooling differentials fell further in 1988, it is important to note that these changes began well before the beginning of the Palestinian uprising. For example, a 41 percent daily wage premium for men with 16 or more years of schooling in 1981 fell to 20 percent by 1986.[10]

Alternative explanations for the decline in relative wages for the well-educated are related to political developments in the Middle East. Many educated workers are employed locally in the public sector as teachers. Jordan, which funded some public sector employment in the territories, experienced economic growth at a rate of 10–11 percent per year between 1976 and 1982 (Zakai, 1988). But economic growth in Jordan slowed dramatically in 1983, and the flow of financial resources from Jordan and other Arab states appears to have been reduced after the PLO was expelled from Lebanon in 1982.

Another important factor in the Palestinian local economy is the repatriation of funds by Palestinians living abroad, mostly in the Gulf States. Rough estimates based on official Jordanian figures (Abu-Shukar, 1990) suggest that the amount of income repatriated declined by 15 percent between 1984 and 1985. A related development is the reduction in opportunities for foreign employment faced by Palestinians around 1982 (Gabriel and Sabatello, 1986; Shaban, 1993).[11]

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[10]This finding is inconsistent with claims by Shaban (1993, p. 667) that access to the Israeli labor market that led to a compression of skill differentials in the territories. The Israeli market was opened to Palestinians in October 1970. Although no evidence has been presented for the 1970s, Table 2 shows that skill differentials remained substantial in the early 1980s.

[11]Out-migration fell sharply in 1982 and 1983 but remained positive throughout the 1980s (CBS 1993, Table 27.1.)

Finally, changes in the wage distribution since 1988 are at least partly explained by the fact civil disorder, curfews, and strikes during the Palestinian uprising disrupted economic activity in the territories more than in Israel.

Although political and social factors might explain the decline in schooling differentials in the local labor market, it is noteworthy that schooling differentials declined for workers employed in Israel as well as for those employed locally.[12] This is documented in Table 3, which reports annual schooling differentials separately by work location. The coefficients reported in Table 3 include main effects for working in Israel (including Jerusalem), schooling-group dummy variables, and the interaction of schooling-group dummies with a dummy that indicates working in Israel or Jerusalem. For example, between 1981 and 1987, the premium paid to workers with 13–15 years of schooling who were employed locally declined from 31 to 8 percent. At the same time, the premium paid to similarly educated workers employed in Israel fell from 10 to 2 percent. This is consistent with the supply-shift story in the model outlined at the beginning of this section, provided the model is augmented to allow for an inelastic Israeli demand for Palestinian schooling.[13]

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[12]My working paper (Angrist 1992) shows that in the 1980s educated Palestinian workers were increasingly likely to work in Israel, though on average more likely to work locally. Overall, roughly 4 percent of Palestinians who worked in Israel had 13–15 years of schooling and roughly 1.5 percent had 16 or more years. Among workers employed in Jerusalem, 5.5 percent had 13–15 years of schooling and 3 percent had 16 or more years of schooling. In the extract used here, a total of over 6,200 workers with higher education were not employed locally. Over 75 percent of local workers with 13 or more years schooling were in administrative, managerial or clerical positions. In contrast, fewer than 42 percent of educated workers working in Jerusalem or Israel were employed in similar positions.

[13]This finding is inconsistent with those of Al-Dweik (1988), who claimed that there is *no* premium for the schooling of Palestinians employed in Israel. Moreover, the pattern of estimated returns to 13–15 years of schooling is similar when men who work in Jerusalem are excluded from the sample. On the other hand, men with 16 or more years of schooling who

A final piece of circumstantial evidence for the supply-shift explanation of changes in schooling differentials between 1981-87 appears in Table 4. This table reports the coefficients on coarse occupation dummies added to the basic specification reported in Table 2. The occupation mix by work location is reported in Table 1. Studies using data from developed countries usually find that an important part of the returns to schooling work through occupation effects. Table 4 shows that this is also true for Palestinian wage-workers because the schooling coefficients are smaller when occupation dummies are added to the regressions. Moreover, beginning in 1984 the pattern of occupation coefficients appears to reflect the increase in the size of educated cohorts in a manner similar to the schooling coefficients. For example, the premium (relative to the reference group of manual laborers) for being in a administrative or managerial job fell from .32 to .12 between 1981-87 while the premium for skilled (blue-collar) labor fell from .12 to .07.

IV. CONTROLLING FOR INDIVIDUAL HETEROGENEITY

The findings presented so far could be explained by a change in the quality or field of study of graduates, or by selection bias resulting from a changing relationship between schooling and labor force participation or out-migration. To provide evidence on the first point, Figure 5 shows the number of graduates from four-year Bachelor's Degree programs by broad field of study for the years 1975–90.[14] The most popular fields are literature and humanities, although the proportion of all graduates in these fields remains roughly constant at around 35–40 percent.

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were employed in Israel outside of Jerusalem received essentially no return to schooling throughout the sample period.

[14]Data in the figure are derived from reports published by The Palestinian Institute for Higher Education (1991, and selected years), and from unpublished tables provided by the Institute.

Students with degrees in science, engineering, and economics and management also constitute 35–40 percent of the total number of graduates throughout the period of rapid growth in Palestinian higher education.

The mix of graduates by field appears fairly constant, but the large numbers of humanities graduates in recent years may have depressed the average returns to schooling if employment opportunities for this group are especially limited. Repeated observations on individuals, however, can help control for these or other composition and selection effects.

A. Panel Data

Households selected for enumeration in the TLFS are interviewed for a second time one quarter after the first interview, for a third time one year after the first interview, and for a fourth time one quarter after the third interview. For example, men interviewed for the first time in the first quarter of 1981 are also interviewed in the second quarter of 1981, and in the first and second quarters of 1982. The TLFS can therefore be used to construct a series of short overlapping panels. I was able to match 80–85 percent of first-interview records to information from the second, third, and fourth interviews. For details, see the appendix to my working paper (Angrist 1992).

Columns 1–3 of Table 5 report estimates of the following equation fit to the sample of third-interview responses separately for each year:

$$(3)\quad \log(w_{it}) = \Sigma_q\, d_{iq}\delta_{qt} + x_{it}\beta_{1t} + x_{it}^2\beta_{2t} + e_{it}\gamma_t + f_{it}\theta_t + \upsilon_{it};\ t = 82, \ldots, 91;$$

where β_{1t} and β_{2t} are the parameters in a quadratic function of potential experience (x_{it}), e_{it} is years of schooling, and f_{it} is a dummy that indicates work in Israel. γ_t and θ_t are the schooling and work-in-Israel coefficients. For purposes of panel estimation, the relationship

between schooling and earnings was parameterized as linear in schooling.[15] Equation (3) was estimated with three additional dummy variables for each year that indicate residence in the Gaza Strip, in a refugee camp, or in urban areas. These variables are added to control for regional differences in worker characteristics other than work location.

Work-in-Israel and linear schooling coefficients for the third-interview regression, reported in columns 1–2 of Table 5, show the same patterns observed in Tables 2-3. The Israel wage premium was negative in 1984–85, but rose to a new high in 1989. The schooling coefficient declined from roughly 4 percent in 1984 to 2.1 percent in 1986, and dropped to zero during the Palestinian uprising. Column 3 of Table 5 shows a similar decline in the effect of potential experience (defined as age *minus* years of schooling *minus* 5, and evaluated at the mean of experience and experience-squared).

Lagging equation (3) one year and adding individual effects gives the following equation for first-time interviews, which occur in the same quarter one year earlier than third-time interviews:

$$(4)\quad \log(w_{it-1}) = \alpha_i + \Sigma_q\, d_{qt}\delta_{qt-1} + (x_{it} - 1)\beta_{1t-1} + (x_{it} - 1)^2\beta_{2t-1} + e_{it}\gamma_{t-1} + f_{it-1}\theta_{t-1} + \upsilon_{it-1};$$

$$t = 82, \ldots, 91.$$

Here I assume that schooling is time-invariant, so that $e_{it} = e_{it-1}$ and $x_{it} = x_{it-1} + 1$. Subtracting (4) from (3) and using these assumptions, we have

$$(5)\quad \log(w_{it}) - \log(w_{it-1}) = \Sigma_q\, d_{iq}(\delta_{qt} - \delta_{qt-1}) + (\beta_{1t-1} - \beta_{2t-1}) + x_{it}(2\beta_{2t-1} + \beta_{1t} - \beta_{1t-1})$$
$$+ x_{it}^2(\beta_{2t} - \beta_{2t-1}) + e_{it}(\gamma_t - \gamma_{t-1}) + f_{it}(\theta_t - \theta_{t-1}) + (f_{it} - f_{it-1})\theta_{t-1} + (\upsilon_{it} - \upsilon_{it-1}).$$

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[15]Because linearity is likely to be a poor approximation to the schooling-earnings relationship at the extremes, observations with less than 6 years of schooling and more than 20 years of schooling are dropped from the estimation sample.

The derivation of equation (5) makes use of the fact that $x_{it}^2 - x_{it-1}^2 = 2x_{it} - 1$. In the estimation, equation (5) includes the time-invariant region-of-residence dummies included in equations (3) and (4) because time-invariant regressors are assumed to have time-varying effects.

It is important to note that equation (5) can be modified to allow for heterogeneous returns to schooling as well as additive heterogeneity originating in the decision to go to school (the latter is represented by α_i). Define $(\gamma_{it} - \gamma_{it-1}) = \tilde{\gamma}_{it}$ to be the individual-specific change in returns to schooling. For example, the year-to-year change in returns to schooling would differ across individuals if the returns to schooling differ by school quality or by field of study. Replacing $(\gamma_{it} - \gamma_{it-1})$ by $\tilde{\gamma}_{it}$ in (5), it is straightforward to show that OLS estimates of the differenced equation have expectation or probability limit equal to a weighted average of $\tilde{\gamma}_i$.[16] Thus, the reported estimates of $(\gamma_t - \gamma_{t-1})$ can be interpreted as estimates of this average. The differenced estimates therefore answer the question of whether (on average) specific individuals experienced a year-to-year decline in the returns to schooling.

Columns 4–6 of Table 5 report estimates of θ_t and $(\theta_t - \theta_{t-1})$. Column 4 reports the coefficient on $f_{it} - f_{it-1}$ in equation (5), which provides one estimate of θ_t. Column 5 reports the coefficient on f_{it}, which provides an estimate of $\theta_t - \theta_{t-1}$. Columns 4 and 5 are combined to provide second estimate of θ_t in column 6. All three columns show evidence of the same decline in the Israel wage premium as observed in column 1, although the alternative estimates suggest somewhat different timing. The alternative estimates are not significantly different in 5 out of 9 comparisons ($p < .02$), but the joint test of coefficient equality for the alternative estimates of θ_t leads to rejection of the null hypothesis.

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[16]The weights are $\tilde{e}_i^2/\Sigma\tilde{e}_i^2$ where $\tilde{e}_i$ is the residual form a regression of schooling on all other covariates in the differenced equation.

Column 7 reports the year-to-year change in schooling coefficients, estimated as the coefficient on e_{it} in equation (5). Here too, the coefficients indicate a change qualitatively similar to the changes in the levels regression (column 2). The schooling coefficient is estimated to have declined by roughly 1.1 percentage point between 1984 and 1985, and by 1.3 percentage points between 1985 and 1986, with further substantial declines during the Palestinian uprising. The results in Table 5 therefore support the claim that the decline in the average returns to schooling was experienced by *individual* Palestinian graduates.

A potential problem with my interpretation of the panel results is that while the derivation of equation (5) assumes that schooling is time-invariant, reported schooling changes between the first and third interviews for roughly 30 percent of the sample. The fact that the frequency distribution of schooling changes is nearly symmetric around zero suggests that the changes in reported schooling from interview to interview are at least partly attributable to mis-reporting or other types of measurement error. The observed decline in schooling coefficients, especially after 1987, could therefore be at least partly attributable to changes in data quality.

To correct for possible measurement error in schooling variables, I tried an instrumental variables (IV) strategy using schooling levels reported at the second interview as an instrument for schooling variables in equations for third interview responses or first-third interview differences. A statistical model justifying this approach is outlined in my working paper (Angrist, 1992). It turns out that IV estimates from this procedure are virtually identical to the OLS estimates.[17]

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[17]IV estimation is based on a modified specification where the potential experience quadratic is replaced by an age quadratic. Only for one year are IV estimates different from OLS estimates, and for equations in levels as well as differences, the statistically significant contrast by estimation technique is very small.

V. THE DEMAND FOR SKILLED LABOR

Figures 6 and 7 show the relationship between the log of average daily wages and the log of cohort size (including men in the labor force plus men temporarily out of the labor force) by quarter and by schooling group for men who reported their usual work location as being in the territories, Israel or Jerusalem. These graphs are motivated by the theoretical framework laid out in the beginning of Section III, which relates changes in schooling differentials to changes in the size of schooling groups. Averages in the figure were computed using CBS sampling weights. The data in Figure 6 are for 1981-87 only; the data in Figure 7 are for 1988-91.

The figures plot the residuals from regressions of log daily wages and log labor force counts on a full set of quarterly period effects and annual schooling-group effects. The slope of the line drawn through the points in the figure is therefore an estimate of the parameter ϕ_g in the equation

$$(6) \quad ln(w_{gt}) = \Sigma_t \, d_t\delta_t \; + \; \Sigma_g \, b_g\gamma_{gt} + \phi_g ln(L_{gt}) + \upsilon_{gt} \, ,$$

where g indexes schooling groups and L_{gt} is the size of the schooling-group cohort. The line drawn is for the 16 or more schooling group. For the sample of quarterly observations for 1981-87, ϕ_g is equal to -.16 (standard error = .06, partial R^2 = .21) for men with 13-15 years of schooling, ϕ_g is equal to -.25 (standard error = .11, partial R^2 = .16) for men with 16 or more years of schooling, and ϕ_g is equal to -.28 (standard error = .07, partial R^2 = .37) for men with 12 or fewer years of schooling.

The regression line in Figure 6 appears to account for an important fraction of the variance in wage differentials between 1981 and 1987. Thus, the figure for 1981-87 is consistent with a moderately elastic demand for educated workers. On the other hand, points plotted in Figure

7 show that in the sample of quarterly observations for 1988-91 there is little relationship between schooling-group size and wage differentials. This suggests that declines in relative wages for educated workers after 1988 are more likely to be attributable to the disruption of local economic activity during the Palestinian uprising than to supply shifts.

VI. CHANGES IN THE ISRAELI WAGE DISTRIBUTION

A natural question raised by the findings presented so far is what was happening to the wages of Israeli citizens during the sample period. If the Palestinian experience was not unique among groups under Israeli influence, then some of the decline in returns to schooling among Palestinians could reflect demand shocks common to the Palestinian and Israeli economies.

Table 6 presents estimates of wage equations for Jewish and non-Jewish Israeli citizens.[18] The data used to construct these estimates are drawn from the Israeli Income Survey (IS) and are described in the data appendix. Briefly, the IS includes residents of urban areas in outgoing rotation groups from the Israeli Labor Force Survey (LFS). The IS sampling frame includes about 94 percent of the Jewish population but only 40 percent of the non-Jewish population. This sample may not be representative of the population of non-Jewish workers. For both ethnic groups, the sample used here is restricted to men aged 18-59.

Citizen Arabs in the Israeli labor market have labor force characteristics closer to those of non-citizen Arabs than to Israeli Jews. For example, estimates from the 1983 Israeli Census, reported in Lewin-Epstein and Semyonov (1993, Tables 3.2 and 3.3), show that 30 percent of Arab men in the Israeli labor force were self-employed and 12 percent were employed as agricultural workers. Both of these proportions are much lower among Jewish Israelis. The

[18]Most non-Jewish Israelis are Moslem Arabs although some are Christian Arabs, Druze, or members of other ethnic minorities.

distribution of educational attainment among Israeli Arabs is also closer to the distribution among noncitizen Arabs than to the distribution among Israeli Jews. In 1985, for example, 25 percent of Israeli Jews aged 15 and over had 13 or more years of schooling while only 8.5 percent of Israeli Arabs had 13 or more years of schooling (CBS 1991b, Table 22.1). Finally, Census data show that, like Arabs from the territories, Israeli Arabs have a high proportion (28 percent) of employment in construction.

The wage variable used to construct the estimates reported in Table 6 is the log of weekly wage and salary earnings. Columns 5 and 10 in the table show average log weekly earnings along with standard deviations for Jewish and non-Jewish workers. Columns 4 and 9 show sample sizes for the subsamples with valid wage data. The estimates in the table are based on samples of 2,489-3,189 observations for Jews but only 119-262 observations for non-Jews. Wages of non-Jews are substantially lower and have less variance than the wages of Jews.

Columns 1-2 and 6-7 report schooling coefficients on dummies for 13-15 years and 16 or more years of schooling in regressions that include quarter dummies, dummies for continent of birth (for Jews), dummies for 5-year age groups, and dummies for work location and region of residence. The work locations and regions of residence are Jerusalem, Haifa, northern Israel, central Israel excluding Tel Aviv, and southern Israel. Tel Aviv is the reference location for both sets of dummies.

The estimates for Jewish Israelis show a pattern of schooling coefficients that is remarkably stable in the 1980s, and similar to the 1981 and 1982 coefficients for Palestinians. The weekly wage premium for those with 13-15 years of schooling ranges from .24 in 1981 to .29 in 1985, falling to .23 in 1989. The daily wage premium for Palestinians was .25 in 1981 and .22 in

1982 (these estimates are from Table 2.) The premium for Jews with 16 or more years of schooling ranges from .40 in 1982 to .45 in 1989. The comparable premium for Palestinians was .41 in 1981 and .37 in 1982.

The returns to higher education for Jewish Israelis show a noticeable decline between 1989 and 1991. The weekly wage premium for workers with 16 or more years of schooling fell from .45 to .37, and the wage premium for 13-15 years of schooling fell from .23 to .18. These declines probably reflect the arrival of a wave of relatively skilled immigrants from the Former Soviet Union. This wave of immigration began in earnest in late 1989. The results of replacing the schooling dummies with years of schooling as a linear regressor, reported in column 3, show a similar pattern. Per-year returns are stable around 6 percent between 1981 and 1988 (with a slight dip in 1988), but show a sharp decline only between 1988-91.

Estimated schooling dummies for non-Jewish Israeli citizens are reported in columns 6-7. These estimates are based on small samples and reflect considerable sampling variance, with some very low and very high estimates. The results show a pattern of a steadily increasing payoff to 13-15 years of schooling from 1981-90. The payoff to 16 or more years fell from 1981-85, as it did for Palestinians, but rose from 1985-89, in contrast with continued declines for Palestinians over this period. Moreover, the conclusion that declining returns were not experienced by non-Jewish Israeli citizens is reinforced by the much more precisely estimated linear schooling coefficients reported in column 8. The linear schooling coefficients for nonJews are virtually unchanged from 1981-85. Schooling coefficients for non-Jews decline thereafter, but these declines are not sharp until 1990.

A final point for this section is that while unemployment rates appear to be increasing with

schooling among Palestinians, among Israeli citizens unemployment rates are lower for the more educated. The former pattern is typical of less developed countries (for example, Kenya, see Todaro, 1981), the latter more commonly observed in wealthier countries like the US (Mincer, 1991). Moreover, in the early 1980s when unemployment among educated Palestinians was growing worse, the situation for educated Jewish Israelis improved. For example, Israeli Jews with 13-15 years of schooling experienced a 1.6 percentage point lower unemployment rate in 1981 than did Israeli Jews with 12 or fewer years of schooling. By 1985, the gap in favor of the more educated had grown to 3.9 percentage points.

VII. SUMMARY AND CONCLUSIONS

This paper provides a case study of wages in a developing region when the higher education system expanded rapidly. Palestinian students who observed wage premia as high as 40 percent when they made enrollment decisions ended up earning less than 20 percent more than high school graduates when they entered the labor market. This suggests that contemporaneous schooling coefficients can be a poor indicator of the ultimate economic value of additional schooling when large numbers of new graduates enter the labor market.

The findings also have implications for economic models of education in development. In a survey of returns to schooling worldwide, Psacharopoulos (1985, p. 592) writes, "Judging from past trends and the degree of underinvestment in education in developing countries, the fears that further educational expansion would lead to unemployed graduates or would lower social rates of return are unfounded." Although the evidence presented here does not speak directly to the issue of social returns, it would appear that this view was overly optimistic for the developing occupied territories. On the other hand, as in Freeman's (1975) study of the US

labor market for college graduates in the early 1970s, recent declines in Palestinian enrollment probably reflect the beginning of a belated supply response to low returns to schooling. This response and the recent prospect of increasing capital investment should eventually restore some economic value to schooling in the territories.

Finally, it is worth noting that as an area under occupation, the labor market in the territories has many unique features. For example, economic aspects of life in the territories during the sample period include the lack of an effective private capital market or banking system with the power to make loans (Shaban 1993.) These limitations undoubtedly contributed to the decline in economic returns to schooling in the territories. The social implications of this human capital/physical capital mismatch would appear to include a climate of disappointment and political instability which culminated in large-scale civil unrest in 1988. The consequences of this mismatch are all the more impressive when one notes that the main period of declining skill differentials, 1985-1988, was one of exceptionally strong growth in real wages for both Palestinians and Israelis.

Table 1: Descriptive Statistics

Men Aged 18-64 in the West Bank and Gaza

Year	Sample size	Age	Gazans	Years of schooling	LFP	Wage worker	Days worked per month	Work in Israel (and month (J'lem)
1981	29,622	33.2	.27	7.65	.72	.48	22.0	.37
1982	30,215	33.1	.27	7.84	.73	.48	22.2	.38
1983	30,962	33.1	.27	7.98	.75	.48	22.0	.39
1984	33,737	33.2	.27	8.07	.76	.48	22.0	.39
1985	34,309	33.0	.27	8.19	.76	.48	21.8	.37
1986	36,137	32.8	.27	8.37	.78	.49	22.3	.37
1987	39,222	32.8	.25	8.36	.81	.52	22.4	.39
1988	34,525	32.7	.20	8.39	.82	.51	17.9	.39
1989	35,292	32.8	.22	8.49	.82	.51	18.3	.38
1990	36,665	32.9	.24	8.53	.82	.51	18.8	.38
1991	34,139	32.9	.23	8.65	.82	.50	17.4	.38

Occupation by work location for men in the labor force

	Works locally					Works in Israel (including J'lem)				
Occ codes	0-2	3-5	6	7-8	9	0-2	3-5	6	7-8	9
1981	11.3	27.0	19.9	31.0	10.9	1.3	13.0	9.9	31.6	44.3
1982	12.3	27.5	20.0	30.0	10.2	1.3	12.2	9.8	32.2	44.5
1983	12.9	28.0	19.4	29.4	10.2	1.5	13.1	9.9	30.4	45.1
1984	12.3	27.8	18.6	29.8	11.5	1.1	13.9	12.1	28.4	44.5
1985	12.0	27.5	19.7	29.0	11.8	1.2	14.1	13.1	28.7	42.9
1986	12.1	27.2	19.7	29.1	11.9	1.4	14.1	13.0	29.1	42.4
1987	11.9	27.0	18.8	31.2	11.1	1.4	16.1	12.4	29.1	41.0
1988	10.9	26.4	20.9	30.4	11.3	1.4	15.5	11.9	27.1	44.1
1989	10.9	27.1	19.9	30.4	11.7	1.2	16.1	11.1	27.5	44.1
1990	10.2	27.2	21.0	30.2	11.4	1.2	14.6	10.5	25.4	48.4
1991	10.4	26.1	21.0	31.1	11.4	1.2	9.8	9.9	28.3	50.8

Notes:

Roughly one-quarter of the sample observations are independent. Statistics are unweighted. CBS occupation codes:

0-2 scientific, academic, professional, technical, administrative, managerial
3-5 clerical, sales, service
6 agricultural
7-8 skilled worker in industry, mining, construction, transport or other sector
9 unskilled worker, other industrial worker, transportation.

Table 2: Wage Determinants

	Daily wage			Monthly wage		
	Work in Israel (inc. J'lem)	13–15 yrs schooling	16+ yrs schooling	Work in Israel (inc. J'lem)	13–15 yrs schooling	16+ yrs schooling
	(1)	(2)	(3)	(4)	(5)	(6)
1981	.184	.251	.408	.073	.296	.462
	(.007)	(.015)	(.017)	(.009)	(.018)	(.021)
1982	.182	.218	.368	.064	.269	.433
	(.007)	(.014)	(.016)	(.008)	(.017)	(.020)
1983	.171	.160	.334	.043	.221	.408
	(.007)	(.013)	(.015)	(.008)	(.016)	(.019)
1984	-.011	.164	.358	-.133	.212	.427
	(.007)	(.012)	(.014)	(.008)	(.015)	(.017)
1985	.004	.145	.278	-.116	.190	.334
	(.006)	(.012)	(.014)	(.008)	(.015)	(.017)
1986	.122	.088	.204	.001	.116	.258
	(.006)	(.011)	(.013)	(.008)	(.013)	(.016)
1987	.194	.050	.178	.066	.062	.205
	(.006)	(.010)	(.012)	(.007)	(.013)	(.015)
1988	.279	-.012	.089	.075	.091	.247
	(.006)	(.010)	(.013)	(.008)	(.013)	(.015)
1989	.368	-.033	.048	.204	.085	.223
	(.006)	(.010)	(.012)	(.007)	(.011)	(.015)
1990	.354	.004	.076	.174	.128	.239
	(.006)	(.009)	(.012)	(.007)	(.011)	(.014)
1991	.431	.011	.107	.251	.119	.258
	(.007)	(.011)	(.013)	(.008)	(.013)	(.016)
Sample			171,691			171,783

Notes:
Sample includes men aged 18–64 who indicated they work in the West Bank, Gaza Strip, Jerusalem or Israel; with valid schooling variables, excluding Gulf War quarter for 1991. Estimates are coefficients from a regression of log wages on a full set of quarterly-period effects, annual work-in-Israel effects, annual effects for ($13 \leq$ schooling ≤ 15), (schooling ≥ 16) and ($25 \leq$ age ≤ 34) effects, ($35 \leq$ ages ≤ 44), ($45 \leq$ age ≤ 54) effects, ($55 \leq$ age ≤ 64) effects, annual effects for residence in a refugee camp, an urban area, and the Gaza Strip, and a single dummy for employment in Jerusalem. Sample weighted by CBS sampling weights. Standard errors in parentheses. Standard errors not corrected for repeat observations on rotation groups.

Table 3: Schooling Coefficients by Work Location

Daily Wage

	Work in Israel	13–15 yrs. schooling Work in			16 + yrs. schooling Work in		
	(1)	Territ. (2)	Israel (3)	Diff. (4)	Territ. (5)	Israel (6)	Diff. (7)
1981	.199	.308	.100	.208	.469	.142	.327
	(.007)	(.017)	(.029)	(.033)	(.019)	(.041)	(.045)
1982	.194	.269	.100	.169	.406	.142	.264
	(.007)	(.016)	(.026)	(.031)	(.017)	(.044)	(.047)
1983	.188	.213	.073	.139	.395	.081	.314
	(.007)	(.016)	(.022)	(.027)	(.017)	(.036)	(.039)
1984	.016	.248	.026	.222	.440	.095	.345
	(.007)	(.015)	(.020)	(.025)	(.016)	(.030)	(.034)
1985	.031	.212	.033	.178	.382	.003	.379
	(.007)	(.015)	(.020)	(.025)	(.016)	(.027)	(.031)
1986	.142	.131	.032	.099	.295	-.031	.326
	(.007)	(.014)	(.017)	(.022)	(.015)	(.025)	(.029)
1987	.208	.078	.018	.060	.237	.031	.207
	(.006)	(.014)	(.016)	(.021)	(.014)	(.023)	(.027)
1988	.291	.009	-.032	.041	.143	-.021	.163
	(.007)	(.014)	(.015)	(.020)	(.015)	(.022)	(.027)
1989	.366	-.060	-.002	-.059	.073	-.017	.090
	(.006)	(.013)	(.013)	(.018)	(.014)	(.021)	(.026)
1990	.363	.010	-.000	.010	.127	-.052	.178
	(.006)	(.013)	(.014)	(.018)	(.014)	(.022)	(.025)
1991	.441	.014	.012	.002	.163	-.027	.190
	(.007)	(.014)	(.017)	(.021)	(.015)	(.027)	(.027)
F-tests for 3rd level interaction (df)			24.3(11)				66.9(11)

Notes: Model and sample are the same as described in Table 2 except that the schooling coefficients are allowed to differ by work location. Column 1 shows Work-in-Israel main effects. Sample weighted by CBS sampling weights. Standard errors in parentheses. Standard errors not corrected for repeat observations on rotation groups.

Table 4: Occupation Effects

	13-15 yrs Schooling	16+ yrs schooling	Occupation Codes admin. 0-2	clerical 3-5	agric. 6	skilled 7
	(1)	(2)	(3)	(4)	(5)	(6)
1981	.180	.335	.150	-.007	-.182	.105
	(.017)	(.020)	(.016)	(.010)	(.011)	(.008)
1982	.106	.239	.232	-.028	-.163	.122
	(.016)	(.019)	(.016)	(.010)	(.011)	(.007)
1983	.115	.279	.115	-.056	-.129	.089
	(.015)	(.018)	(.015)	(.010)	(.011)	(.007)
1984	.038	.196	.315	.015	-.202	.115
	(.014)	(.016)	(.015)	(.009)	(.010)	(.007)
1985	.030	.149	.278	.036	-.161	.100
	(.013)	(.016)	(.015)	(.009)	(.010)	(.007)
1986	.031	.129	.180	-.022	-.154	.102
	(.012)	(.015)	(.014)	(.008)	(.010)	(.007)
1987	0.016	.125	.121	-.078	-.130	.070
	(.011)	(.014)	(.013)	(.008)	(.010)	(.007)
1988	-.010	.087	.026	-.106	-.133	.055
	(.011)	(.014)	(.014)	(.008)	(.009)	(.007)
1989	.003	.102	-.074	-.128	-.112	.067
	(.010)	(.013)	(.012)	(.008)	(.010)	(.007)
1990	.009	.085	.009	-.129	-.104	.067
	(.010)	(.013)	(.013)	(.008)	(.009)	(.006)
1991	.018	.118	.004	-.157	-.128	.083
	(.012)	(.015)	(.015)	(.010)	(.011)	(.007)
Sample: 171,518						

Notes:
Sample includes men aged 18-64 who indicated they work in the West Bank, Gaza Strip, Jerusalem or Israel; with valid schooling variables. Estimates are coefficients from the same model reported in Table 3, with the addition of 4 occupation dummies. The occupation reference group is 9 (unskilled industrial and transportation workers). Sample weighted by CBS sampling weights. Standard errors in parentheses. Standard errors not corrected for repeat observations on rotation groups.

Table 5: First-Difference Estimates of the Daily Wage Equation

	Levels (3rd interview)			Differences (3rd-1st)			
	Work in Israel $[\theta_t]$ (1)	Years of schooling $[\gamma_t]$ (2)	Potential exper. $[\beta_t]$ (3)	Work in Israel $[\theta_t]$ (4)	Work in Israel $[\theta_t'-\theta_{t-1}]$ (5)	Work in Israel $[\theta_t']$ (6)	Years of schooling $[\gamma_t-\gamma_{t-1}]$ (7)
1981						.281	
						(.031)	
1982	.214	.040	.276	.268	-.013	.193	-.001
	(.019)	(.003)	(.024)	(.031)	(.023)	(.031)	(.003)
1983	.154	.032	.185	.171	-.022	.250	.0004
	(.019)	(.003)	(.024)	(.031)	(.023)	(.031)	(.003)
1984	-.008	.039	.281	.054	-.196	.150	.008
	(.018)	(.003)	(.023)	(.030)	(.022)	(.029)	(.003)
1985	-.048	.031	.210	.073	-.078	.032	-.011
	(.017)	(.003)	(.022)	(.029)	(.021)	(.027)	(.003)
1986	.119	.021	.172	.105	.072	.219	-.013
	(.016)	(.002)	(.022)	(.027)	(.020)	(.025)	(.003)
1987	.199	.026	.192	.264	.045	.141	-.008
	(.016)	(.002)	(.020)	(.025)	(.019)	(.024)	(.003)
1988	.282	.011	.136	.227	.087	.114	-.008
	(.016)	(.002)	(.020)	(.025)	(.019)	(.028)	(.003)
1989	.399	.003	.126	.198	.083	.300	-.013
	(.016)	(.003)	(.021)	(.028)	(.020)	(.028)	(.003)
1990	.347	.014	.171	.232	-.067	.323	.005
	(.015)	(.002)	(.019)	(.027)	(.018)	(.028)	(.003)
1991	.429	.017	.118	.354	.031		.002
	(.017)	(.003)	(.023)	(.029)	(.021)		(.003)
Sample size	20,333					19,762	

Notes to Table 5: Sample includes men aged 18-62 with earnings in the first interview, interviewed for the third time in 1982 or later, and who reported 6-20 years of schooling at the third interview. Coefficients in columns 1-3 are estimates from a regression of log daily wages on quarterly period effects, work-in-Israel dummies, years of schooling, potential experience quadratic, dummies for Gaza residence, dummies for residence in a refugee camp, and dummies for urban residence. Coefficients in columns 4-6 are from the same specification, replacing the dependent variable with the change in log daily wages from the third to the first interview, and adding changes in work-in-Israel dummies to the list of regressors. The potential experience quadratic is evaluated at the mean of experience and experience-squared. Columns 4 and 6 are alternative estimates of the same work-in-Israel coefficients. Columns 5 and 7 report the change in work-in-Israel and schooling coefficients. Sample not weighted by CBS sampling weight. Four out of 9 of the alternative estimates of θ_t were significantly different ($p < .002$). The joint $F(9, 19643)$ statistic is 7.98.

Table 6: Schooling Coefficients for Israeli Citizens

	Jews					Nonjews				
	13-15 years (1)	16+ years (2)	linear (3)	sample size (4)	mean wage (5)	13-15 years (6)	16+ years (7)	linear (8)	sample size (9)	mean wage (10)
1981	.240	.413	.062	3,189	7.04	.044	.855	.042	119	6.44
	(.028)	(.029)	(.003)		(.610)	(.196)	(.237)	(.013)		(.545)
1982	.282	.403	.059	3,141	7.86	.152	.561	.046	158	7.38
	(.028)	(.028)	(.003)		(.597)	(.160)	(.233)	(.013)		(.519)
1985	.286	.448	.060	2,733	5.18*	.231	.364	.044	172	4.61
	(.031)	(.032)	(.003)		(.648)	(.171)	(.178)	(.013)		(.612
1988	.231	.396	.056	2,489	6.01	.274	.427	.040	255	5.57
	(.029)	(.030)	(.003)		(.605)	(.089)	(.129)	(.008)		(.393)
1989	.229	.448	.063	2,696	6.19	.266	.564	.038	243	5.84
	(.029)	(.030)	(.003)		(.640)	(.083)	(.098)	(.007)		(.581)
1990	.191	.391	.057	2,801	6.33	.296	.257	.033	237	5.98
	(.028)	(.029)	(.003)		(.632)	(.093)	(.078)	(.007)		(.368)
1991	.180	.368	.053	3,062	6.43	-.015	.074	.020	262	6.17
	(.027)	(.028)	(.003)		(.638)	(.095)	(.097)	(.007)		(.390)

Notes: The table shows coefficients on dummies for 13-15 and 16 or more years of schooling from regressions of log weekly wages on quarter dummies, dummies for continent of birth, 5 year age groups, work location, and region of residence. The sample includes male salaried employees aged 18-59. Standard errors in parentheses except for columns 4 and 8, which show the standard deviation of log wages in parentheses. *The currency was to switched to New Israeli Shekels (1 NIS = 1000 Shekels) in 1985.

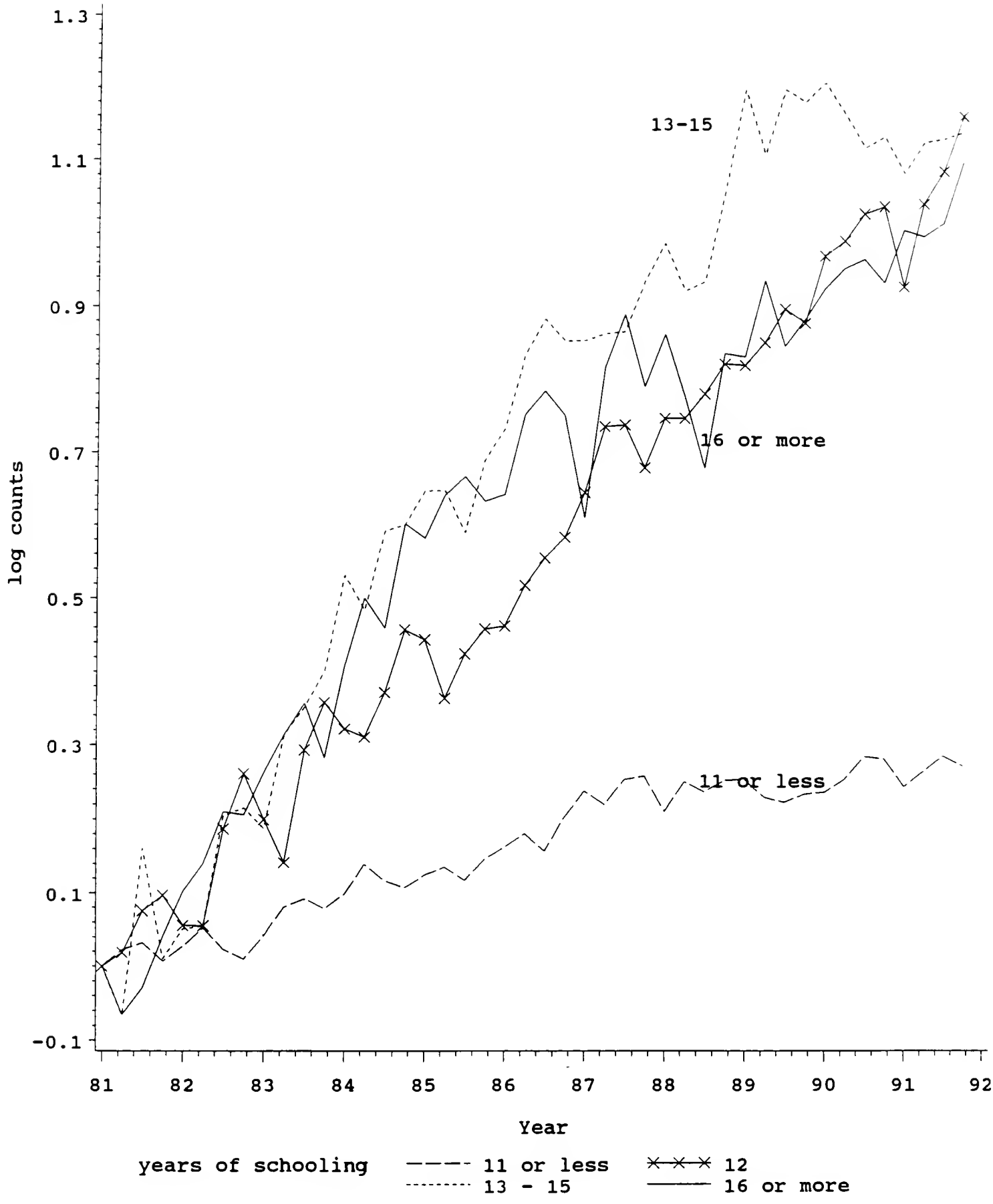

Figure 1. Labor force size by schooling group
Log of weighted labor force counts relative to first-quarter 1981

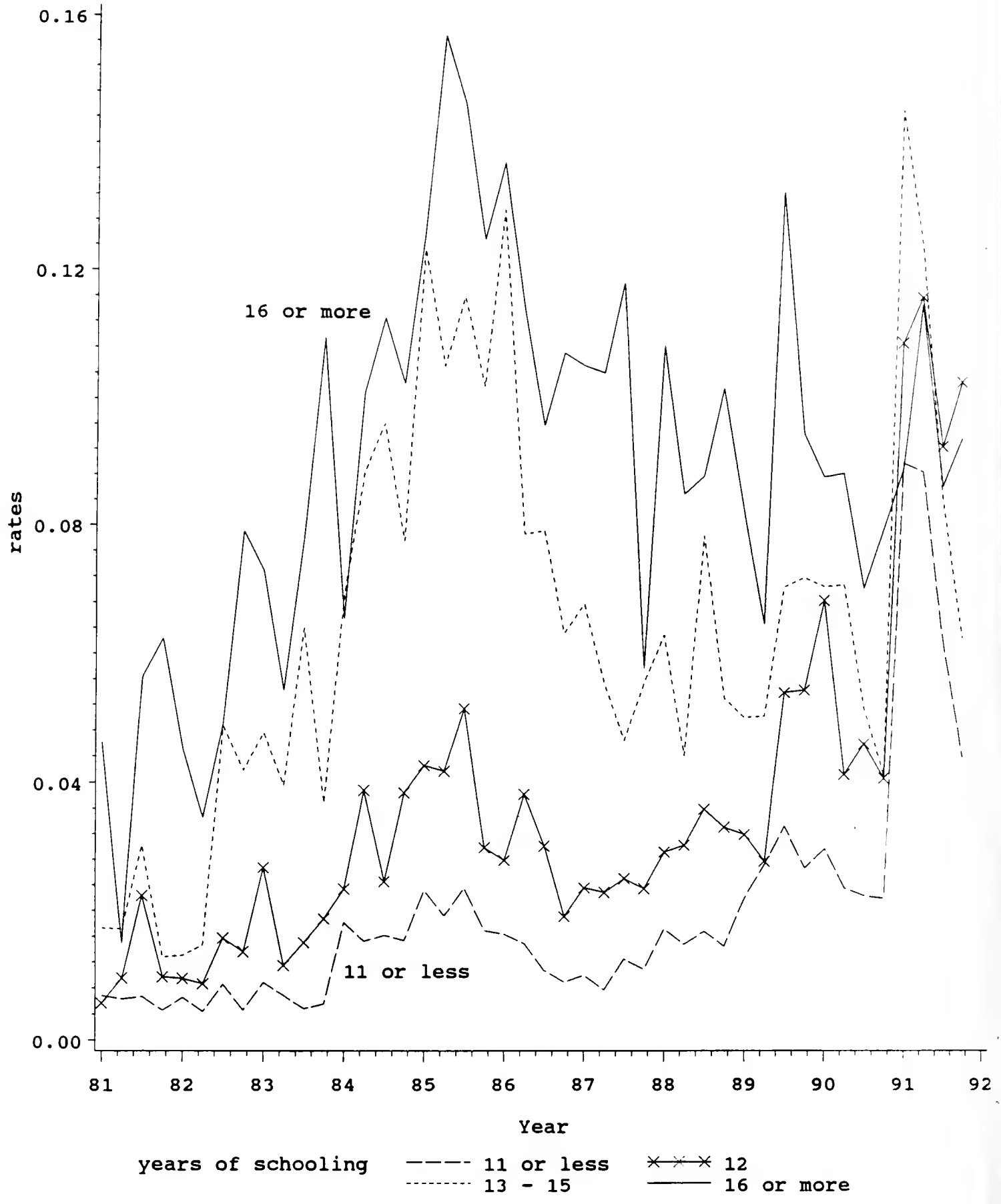

Figure 2. Unemployment rates by schooling group
Quarterly weighted averages for men aged 18-64

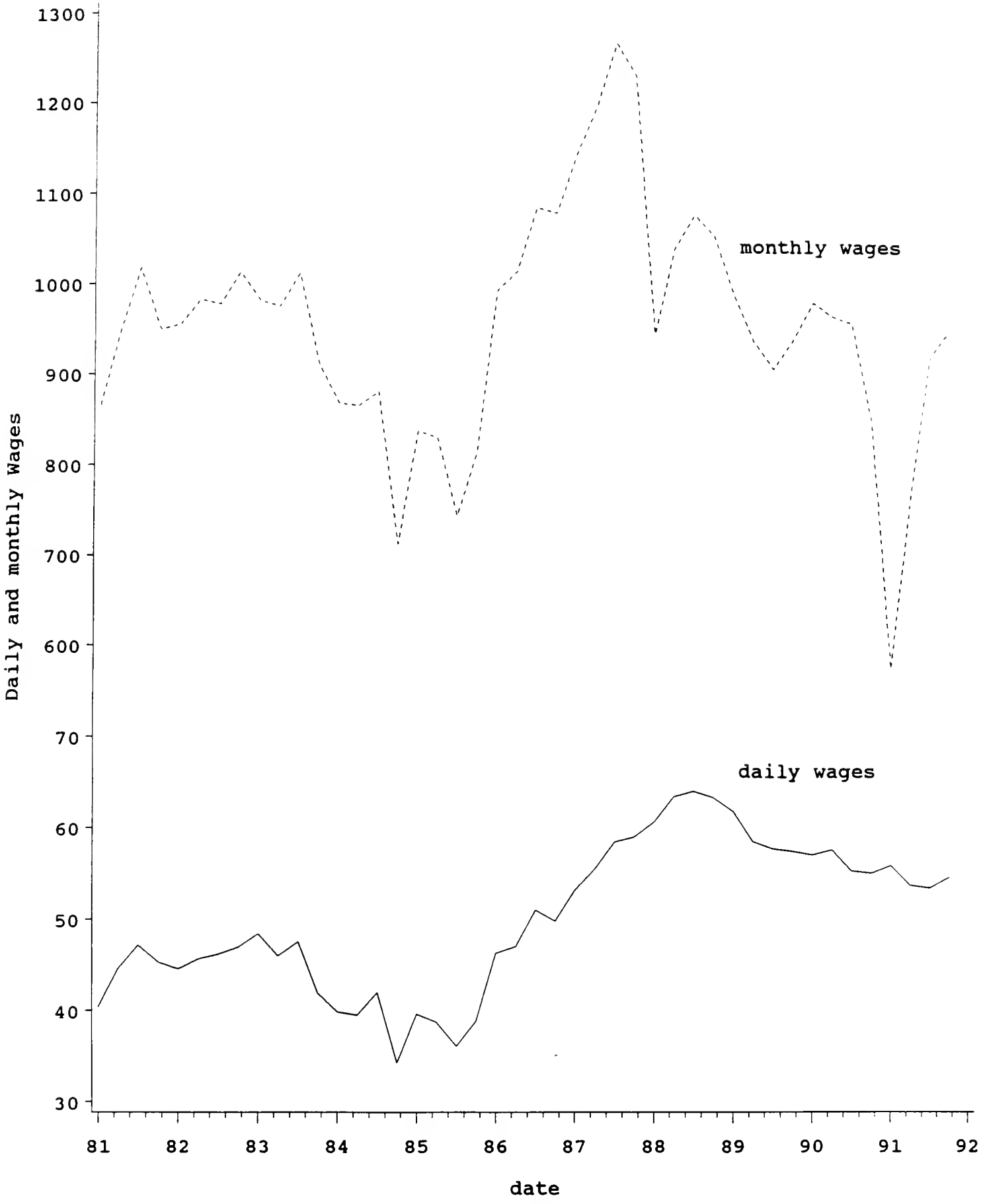

Figure 3. Survey data on daily and monthly wages (Sept. 1992 NIS)
Source: Weighted quarterly averages from CBS survey data

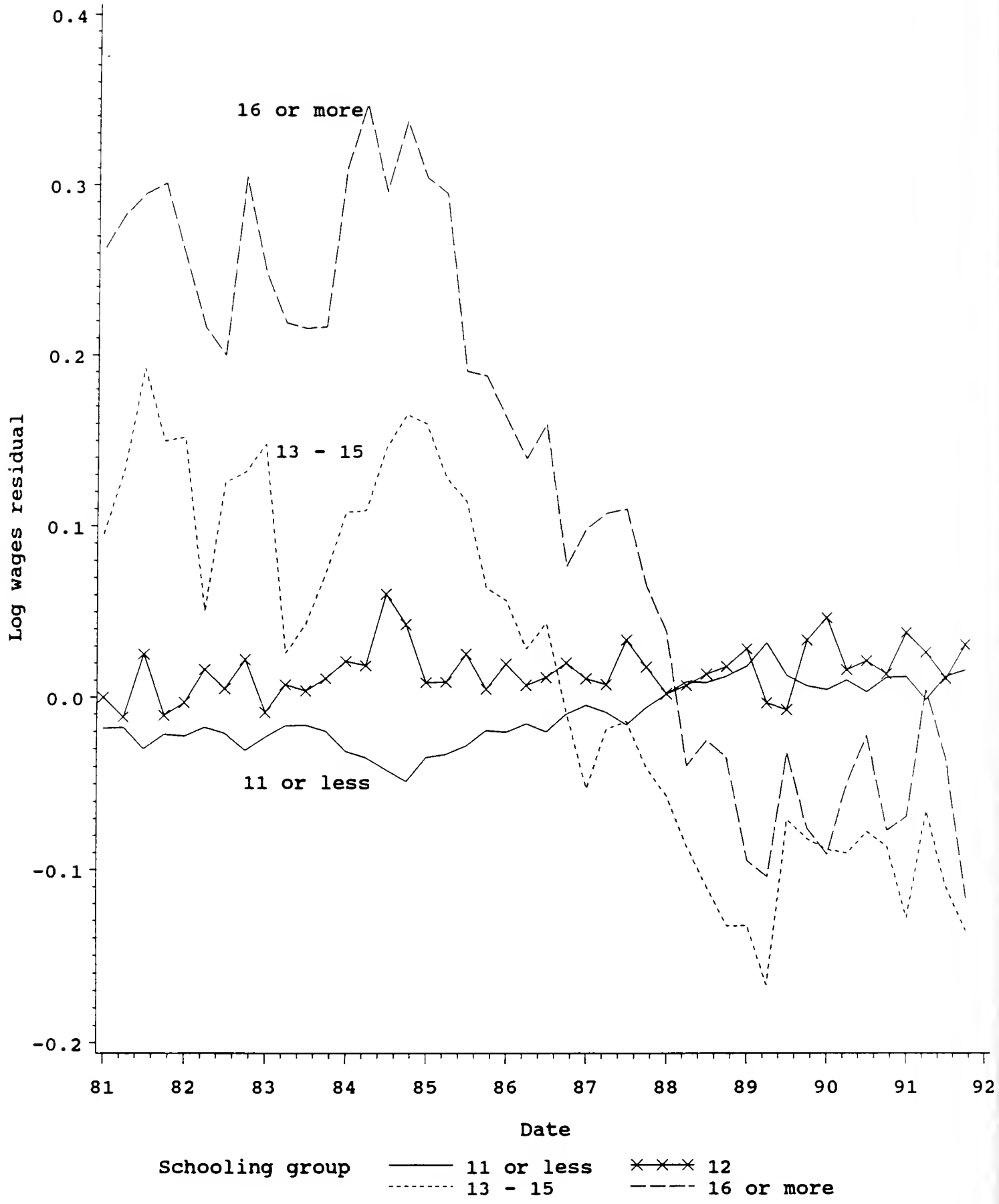

Figure 4. Daily Wages by schooling group
Residuals from a regession on period and age effects

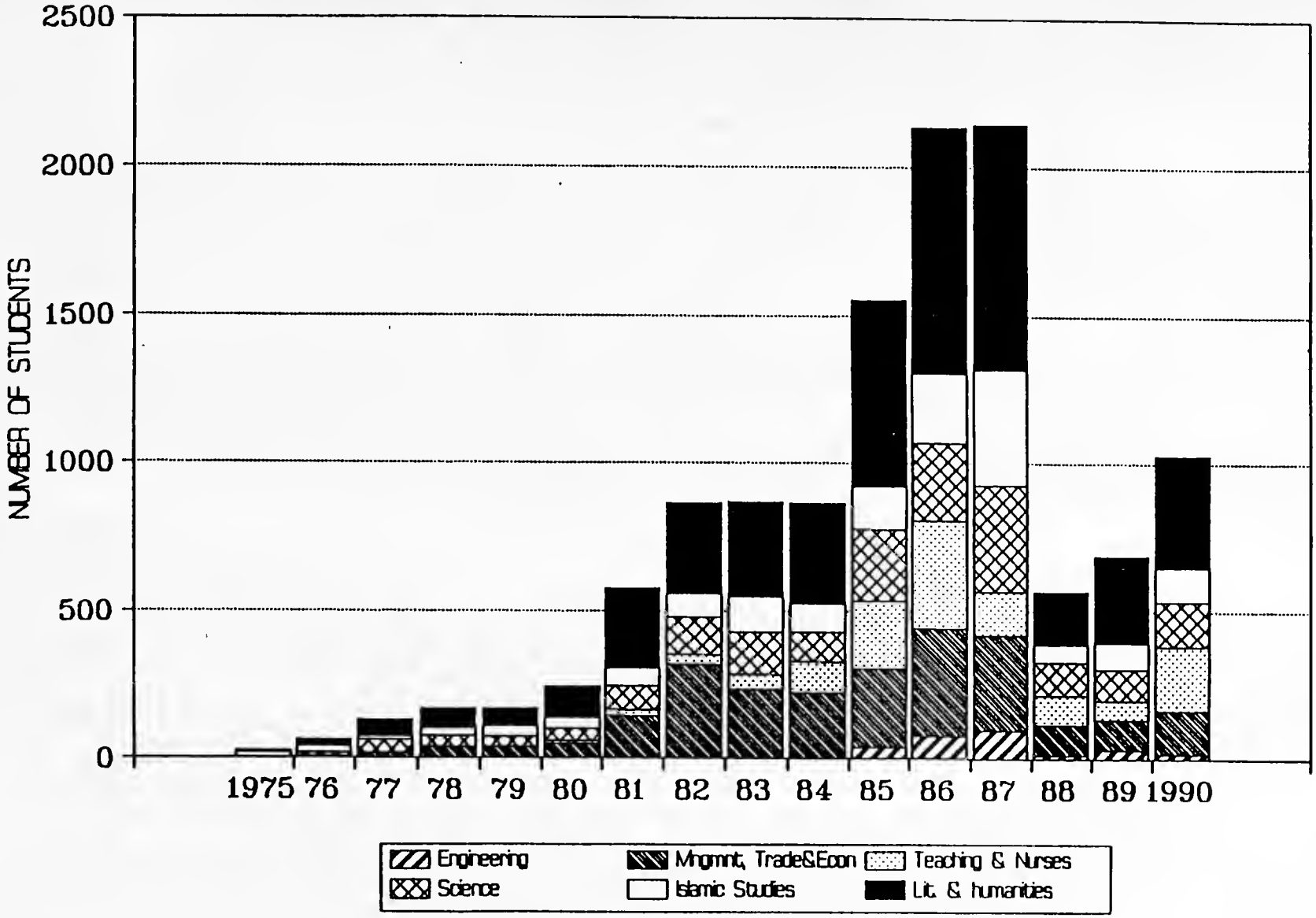

Figure 5. West Bank and Gaza Strip college graduates by field.
Source: Palestinian Institute for Higher Education.

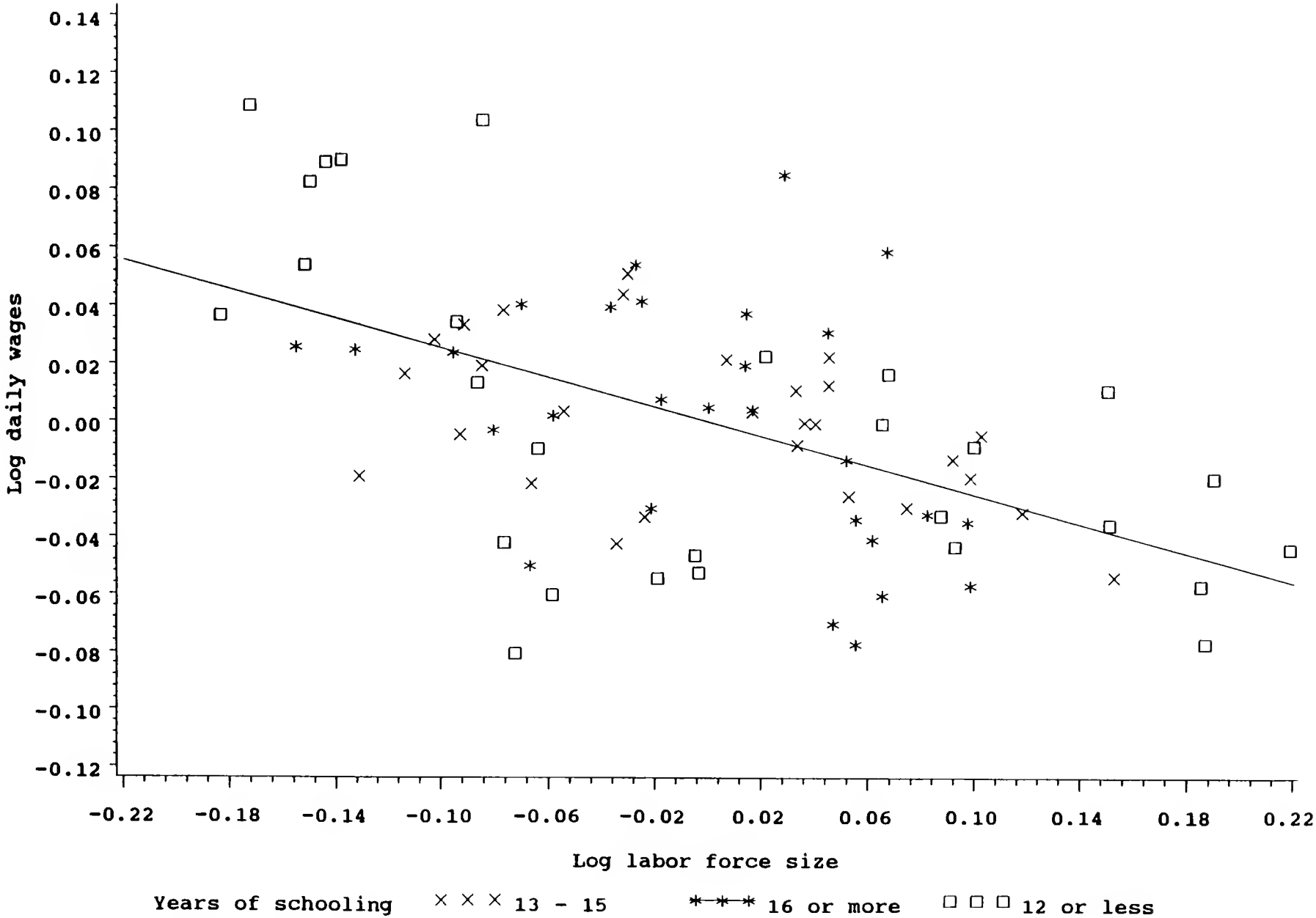

Figure 6. Wages and the size of schooling groups: by schooling group
Residuals from a regression on period and schooling-group effects
Quarterly averages for 1981-87

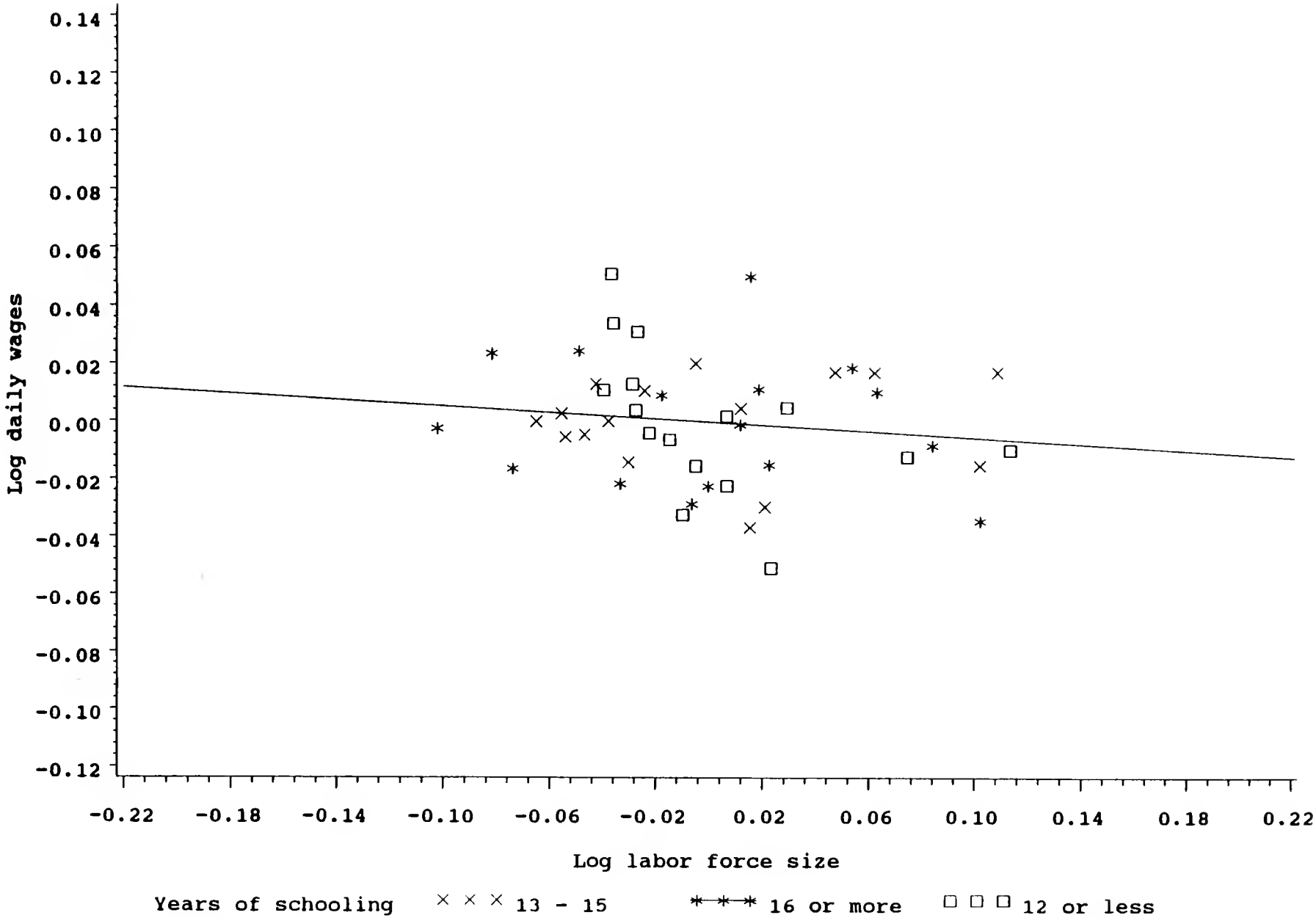

Figure 7. Wages and the size of schooling groups: by schooling group
Residuals from a regression on period and schooling-group effects
Quarterly averages for 1988-91

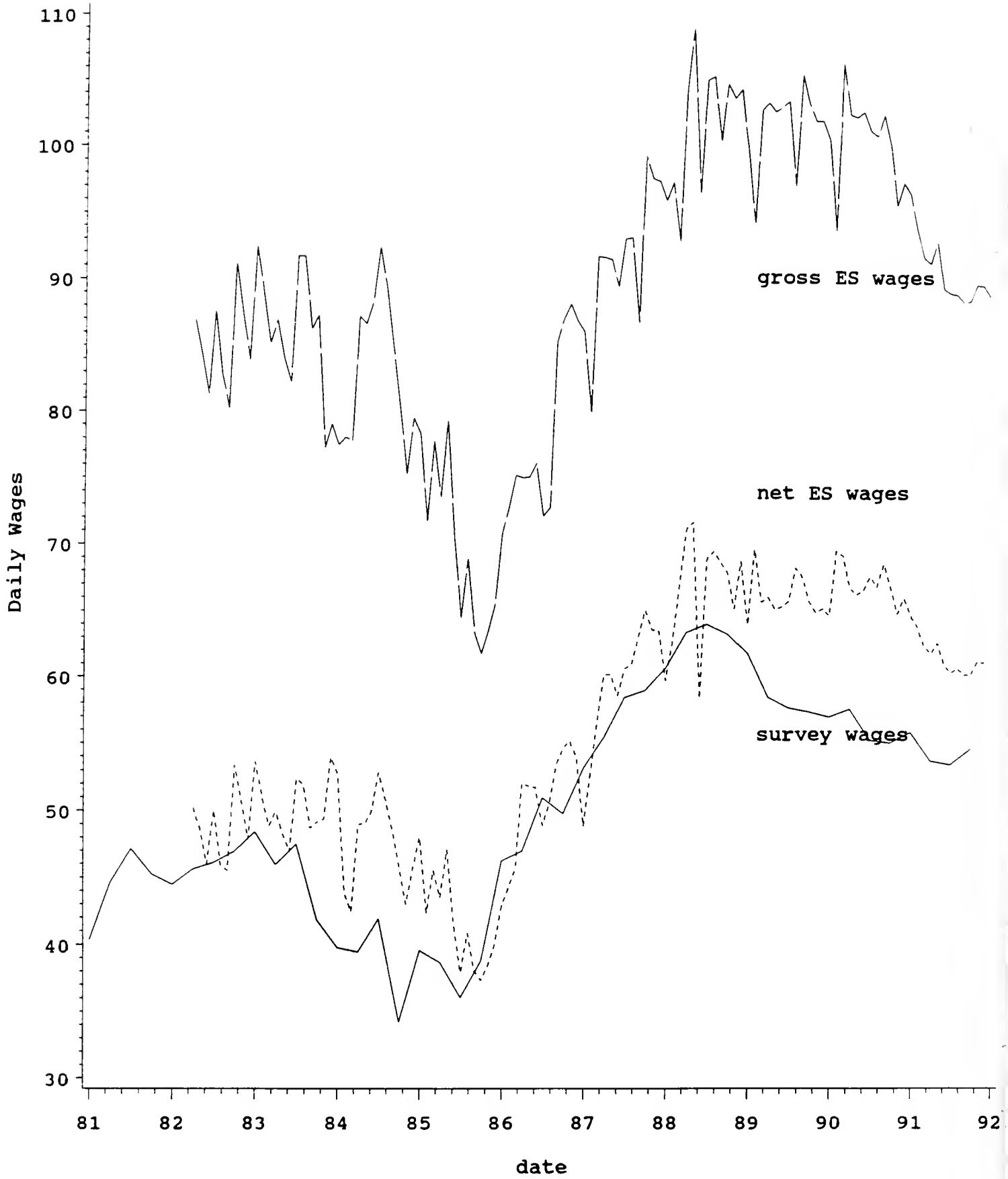

Figure A.1. Daily wage data from alternative sources (Sept. NIS)
Sources: Monthly Employment Service data and CBS quarterly survey data
ES net = net of NI, inc. tax, pension contribs., social and health dues
Survey data is for workers employed in Israel and Jerusalem

Data Appendix

1. Alternative sources of wage data

Palestinian sources

The frequency distribution of daily wages for a sample of roughly 700 workers employed in Israel in the summer of 1984, reported in Abu-Shukar (1987a), generates an average daily wage of NIS 34.5 (in fourth-quarter 1990 prices) for Gazans and NIS 30.8 for residents of the West Bank.[19] Comparably deflated, CBS data on the wages of workers employed in Israel in 3rd quarter 1984 give an average of NIS 33.1 for male Gazans and NIS 31.2 for men living in the West Bank. The wage distribution for a sample of roughly 400 workers employed locally in the summer of 1985, reported in Abu-Shukar (1987b), generates an average daily wage of NIS 31 for Gazans and NIS 28 for residents of the West Bank. CBS data on the wages of workers employed locally in the third quarter of 1985 give an average of NIS 33.3 for Gazans Strip and NIS 32 for men living in the West Bank. Standard errors for the CBS average are on the order of NIS 3–4, so that these alternative estimates are not statistically different from the CBS estimates.

Israeli Employment service data

Workers from the territories employed in Israel must register with the ES. Moreover, Israeli law requires that payments to workers from the territories be made through the ES.[20] The ES data on wages and days worked are compiled by the ES from employer payroll worksheets. A

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[19]I calculated these averages from reported frequency distributions using interval midpoints. The Abu-Shukar (1987b) sample is 97 percent male.

[20]During most of the sample period, the number of workers registered was less than half the number who indicated in CBS surveys that they work in Israel. ES coverage of workers from the territories rose to roughly 70 percent after the 1991 Gulf War.

copy of the employer worksheet appears in Israel Employment Service (1992). For each month, the ES data show the total payments made to workers from the territories and the total number of days worked by registered workers.

An estimate of the average daily wage for this period is the ratio of total payments to total days worked. ES wage data calculated in this manner are plotted in **Figure A.1** along with a comparable survey-based series (both in September 1992 prices.) The gross ES series in the figure was computed from the quarterly wage bill, including overtime, employers' and workers' National Insurance contributions and cash benefits (e.g., sick pay and vacation pay). The ES and TLFS wage series show a similar pattern, although the ES daily wage is roughly double the TLFS survey wage.

One reason ES and TLFS levels differ is that the ES payments data record payments before deductions of any kind. The TLFS data, however, probably correspond to a measure of net wage rates after taxes and other deductions. I therefore used ES monthly data on taxes and deductions to convert ES gross wages into net wages by subtracting employer and employee contributions to National Insurance (11-15 percent of net wages), income taxes (2-3 percent of net wages), pension fund contributions (roughly 13 percent of net wages), training fund contributions, health insurance, and union dues (4-6 percent of net wages).

The net ES and CBS series in **Figure A.1** show that in 1982 and between 1986 and 1988 there was little difference between net ES wages and TLFS wages. In other years, net ES wages are no more than 20 percent higher than TLFS wages. The gap between ES and TLFS wages, however, appears to be growing since 1988. The post-88 decline in TLFS wages relative to ES net wages might reflect a decline in demand for unregistered workers when enforcement of

worker registration provisions became stricter as a consequence of the Palestinian uprising.

2. Israeli Income Surveys

The IS is a supplement to the quarterly Israeli Labor Force Survey (LFS), which is a stratified random sample drawn from a sampling frame of almost all residential dwelling units in Israel, supplemented with data from the 1983 or earlier Censuses of Population. Data for the LFS are collected using the same 2-2-2 quarterly rotation group design used in the TLFS. Thus, every quarter, one-quarter of the households who have been interviewed in the LFS are retired from the survey. Only households in these outgoing rotation groups are given the IS supplementary questionnaire. A detailed discussion of the LFS appears in CBS (1992). A detailed discussion of the IS appears in CBS (1993b).

The IS sample is limited to outgoing LFS households in Jewish or mixed-ethnicity localities with 2000 inhabitants or more at the time of the 1983 Census and households in non-Jewish localities with 10,000 or more inhabitants at the time of the 1983 Census. This sampling frame includes about 94 percent of the Jewish population but only 40 percent of the non-Jewish population. The sample size is also reduced by a high refusal rate among selected households (about 28% in the 1989-91 surveys; see CBS 1993b). Many of those who do respond to questions about income supply only partial information. Some of the missing information for partial respondents is imputed. The survey weights are also adjusted for demographic correlates of non-response.

As with the TLFS, IS and LFS micro data files are not systematically released for public use with official user documentation, although some files with Israeli data are maintained and

distributed by the Social Science Data Archive (SSDA) at Hebrew University. Results from the 1991 IS (reported in CBS 1993b, page 21) show that 3,933 households were surveyed in 1991. My tabulation of the 1991 SSDA microdata tape generated a sample of 3,373 men aged 18-59. The IS questionnaire format and variable definitions change from year to year. For the purposes of this project, uniform extracts imposing consistent variable definitions wherever possible were prepared from the 1981, 1982, 1985, and 1988-91 surveys. There was no IS in 1986 and micro data from the 1983, 1984, and 1987 surveys contained many inconsistencies and appeared unreliable.

The IS micro sample contains relatively few demographic variables, while the LFS micro sample is released with a rich and detailed set of covariates but no information on wages or income. For the purpose of this project the LFS variables were matched to the IS using a statistical matching algorithm so that some LFS covariates (such as survey quarter) could be included in the analysis. The statistical match was virtually 100% successful.

Wage and salary earnings collected in the IS are meant to be a measure of gross earnings. From 1981-82, wage data in the IS was collected by recording monthly earnings in each of the 12 months preceding the interview and summing to annual earnings. Annual earnings were converted to weekly earnings by diving by annual weeks worked. From 1985 onwards, data on monthly wage and salary earnings were collected by recording monthly earnings for the 3 months preceding the IS interview and then averaging. This measure was converted to weekly earnings by dividing average monthly earnings by the average number of weeks worked per month in the three preceding months.

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